From: Coltrain, Katrina

**Sent:** Friday, July 29, 2016 2:59 PM

**To:** Perez, Myra; Warren, Christy; Flores, Raymond

**Cc:** Luis Vega (lvega@eaest.com); Patrick Appel (pappel@eaest.com)

**Subject:** Wilcox Oil Company - Lab Request Forms Updated

Attachments: Lab sample tables 7-29-16.pdf; Primary COPCs for Wilcox 7-27-16.xlsx; WILCOX RI Sept 12-2016

Sample Request Form 7-29-16.doc; WILCOX RI Sept 19-2016 Sample Request Form 7-29-16.doc

All, please find attached the Lab Request Forms for Wilcox Oil. As discussed, we will be in the field the weeks of September 12 and September 19. In addition, we have confirmed that additional funding for the project will not be forthcoming in time for us to complete all actions we planned; therefore, the number of samples being requested for soil has been significantly reduced.

Also, you will notice that the plan is to use the pre-weighted vials/stir bar for sampling the VOCs in soil (rather than the core samplers as mention on the conference call). Because of the nature of the sampling, some of them may be medium soil but we are not certain that is the case. Can we indicate on the Chain-of-custody the samples we think will be medium and if the lab finds that the samples may be low, rerun the sample without dilution as a low concentration sample?

Thank you for your time and patience as we worked through these issues. I hope that these forms provide you with a better understanding of what we need for the RI. Please call with any questions.

#### thanks

Katrina Higgins-Coltrain Remedial Project Manager US EPA Region 6 LA/OK/NM Section (6SF-RL) 1445 Ross Avenue Dallas, Texas 75202 214-665-8143

### TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

												Analysis				
Sample Location	Sample Medium	Rationale	Nunber of Sample Locations	Sample Identification	Sampling Tool	Sampling Depth (ft bgs)	Field Screening by PID	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Lorraine Process Area			26	LPA-SB-01-0.5 through LPA-SB-26-0.5	T	0.0 - 0.5	Vac	26	26	26	26	26	0	0	0	1 0
	Surface soil	To assess potential	26 26	LPA-SB-01-0.5 through LPA-SB-26-0.5 LPA-SB-01-2.0 through LPA-SB-26-2.0		0.0 - 0.5	Yes Yes	26	26	26	26	26	0	0	0	0
,		source areas and	26	LPA-SB-01-6.0 through WPA-SB-26-6.0	Split spoon	2.0 -6.0	Yes	26	26	26	26	26	0	0	0	0
Lorraine Process Area (LPA)	Subsurface soil	delineate nature and	26	LPA-SB-01-10.0 through LPA-SB-26-10.0	Continuous sampler PVC/acetate sleeve	6.0 - 10.0	Yes	26	26	26	26	26	0	0	0	0
	Subsurface soft	extent	26	LPA-SB-01-?? through LPA-SB-26-??		2 ft interval above refusal	Yes	26	26	26	26	26	0	0	0	0
	Surface soil		4	LPA-SB-27-0.5 through LPA-SB-30-0.5		0.0 - 0.5	Yes	4	4	4	4	4	4	0	0	0
	Surface son	To determine if	4	LPA-SB-27-2.0 through LPA-SB-30-2.0	Split spoon	0.5 - 2.0	Yes	4	4	4	4	4	0	0	0	0
Lorraine Process Area (LPA)		cooling pond is a	4	LPA-SB-27-6.0 through WPA-SB-30-6.0	Continuous sampler	2.0 -6.0	Yes	4	4	4	4	4	0	0	0	0
Cooling Pond	Subsurface soil	source area	4	LPA-SB-27-10.0 through LPA-SB-30-10.0	PVC/acetate sleeve	6.0 - 10.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-?? through LPA-SB-30-??		2 ft interval above refusal	Yes	4	4	4	4	4	0	0	0	0
Wilcox Process Area					T		I I			I	1	I	T 110 1			
Wilcox Process Area (WPA)	Surface soil	To assess potential source areas and delineate nature and	65	WPA-SB-01-0.5 through WPA-SB-65-0.5	Split spoon Continuous sampler	0.0 - 0.5	Yes	65	65	65	65	65	Total 10 samples: 7 Randomly Selected Borings + WPA-SB-01-0.5 WPA- SB-01-0.5 WPA-SB-19-0.5	10	10	10
		extent	65	WPA-SB-01-2.0 through WPA-SB-65-2.0	PVC/acetate sleeve	0.5 - 2.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01 -6.0 through WPA-SB-65-6.0		2.0 -6.0	Yes	65	65	65	65	65	0	0	0	0
	Subsurface soil		65	WPA-SB-01 -10.0 through WPA-SB-65-10.0		6.0 - 10.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01-?? through WPA-SB-65-??		2 ft interval above refusal	Yes	65	65	65	65	65	0	0	0	0
East Tank Farm Area					<u> </u>					1	1	ı	1			
	Surface soil		11	ETF-SB-01-0.5 through ETF-SB-11-0.5		0.0 - 0.5	Yes	11	11	11	11	11	0	0	0	0
		To assess potential source areas and	11	ETF-SB-01-2.0 through ETF-SB-11-2.0	Split spoon	0.5 - 2.0	Yes	11	11	11	11	11	0	0	0	0
East Tank Farm (ETF)		delineate nature and	11	ETF-SB-01-6.0 through ETF-SB-11-6.0 ETF-SB-01-10.0 through ETF-SB-11-10.0	Continuous sampler	2.0 -6.0 6.0 - 10.0	Yes Yes	11	11 11	11	11 11	11 11	0	0	0	0
	Subsurface soil	extent	11	ETF-SB-01-?? through ETF-SB-11-??	PVC/acetate sleeve	2 ft interval above refusal	Yes	11	11	11	11	11	0	0	0	0
East Tank Farm (ETF)	Surface soil	To determine if this is	10	ETF-SB-12-0.5 through ETF-SB-21-0.5	Split spoon Continuous sampler	0.0 - 0.5	Yes	10	10	10	10	10	0	0	0	0
Tanks 1 and 4	Surface soil	a source area	10	ETF-SB-12-2.0 through ETF-SB-21-2.0	PVC/acetate sleeve	0.5 - 2.0	Yes	10	10	10	10	10	0	0	0	0
Total Soil Samples								550	550	550	550	550	14	10	10	10
Soil Investigation QC																
Field Duplicates	Soil			1 per 10 samples				55	55	55	55	55	2	1	1	1
MS/MSDs	Soil			1 per 20 samples (extra volume only; not include	led in total sample count)			28	28	28	28	28	1	1	1	1
Total Soil Samples Associated w	ith Soil Investigation	on						633	633	633	633	633	17	12	12	12
Water QC Samples																
Trip blanks	Water			1 per cooler containing equipment rinsate for equipment	ment used in soil investigation			15	0	0	0	0	0	0	0	0
Equipment blanks	Water			1 per day per set of for nondedicated equipment per team					30	30	30	30	1	1	1	1
Total Water QC Samples Associ	ated with Soil Inve	stigation						45	30	30	30	30	1	1	1	1

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#### TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

												Analysis				
			Nunber of			Sampling		VOCs			TAL Metals					
			Sample			Depth	Field Screening	(includes	PAHs	GMOG	(includes	G 11	Hexavalent	D (1.1)	DCD	Dioxins/
	Sample Medium	Rationale	Locations	Sample Identification	Sampling Tool	(ft bgs)	by PID	EDB)	(SIM)	SVOCs	Mercury)	Cyanide	Chromium	Pesticides	PCBs	Furans
Background																
					ICS Methodology											
Background grid	Surface soil	Background	1	BKG-0.5	Hand auger	0.0 - 0.5	Yes	0	1	0	1	0	0	0	0	1
Buenground gird	Surrace son	Duenground	-	2110 010	Slide hammer	0.0 0.5	105	Ü	•		•		v	Ů	Ü	
	ļ				Scoop											1
Total Background Soil Samples								0	1	0	1	0	0	0	0	1
Background Soil QC																
Field Replicates	Soil			1 Duplicate (BKG-0.5-D) and 1 Triplication	ate (BKG-0.5-T)			0	2	0	2	0	0	0	0	2
MS/MSDs	Soil			1 per 20 samples (extra volume only; not include	ed in total sample count)			0	1	0	1	0	0	0	0	1
Total Soil Samples Associated w	ith Background							0	3	0	3	0	0	0	0	3
Water QC Samples																
Trip blanks	Water			1 per cooler containing equipment rinsate for equipment used in soil investigation				0	0	0	0	0	0	0	0	0
Equipment blanks	Water			1 per day per set of for nondedicated equipment per team				0	1	0	1	0	0	0	0	1
Total Water QC Samples Associ	ated with Backgrou	nd Soil						0	1	0	1	0	0	0	0	1

#### NOTES:

Sample depth will vary depending upon location of sample and depth of refusal; as a result, the number of samples collected may be less than shown.

bgs = Below ground surface NORM = Naturally-occurring radioactive materials SIM = Selective ion monitoring

EDB = Ethylene dibromide PAH = Polycyclic aromatic hydrocarbon SVOC = Semivolatile organic compound

ft = foot (feet)
PCB = Polychlorinated biphenyl
TCS = Incremental Composite Sampling
PID = Photoionization detector
TPH = Total petroleum hydrocarbons
PVC = polyvinyl chloride
VOC = Volatile organic compound

MSD = Matrix spike duplicate QC = Quality control

TABLE 8. PROPOSED FIELD PROGRAM FOR PRIVATE SUPPLY WELL AND PIEZOMETER SAMPLING

			Analyses										
Sample Location	Sample Identification	Sampling Method	Field Parameters	LNAPL Characterization	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Sample Location	GW-01	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-02	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
East Tank Farm Residential Wells	GW-03	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-04	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-05	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of East Tank Farm Residential	GW-06	*	1	0	1	1	1	1	1	1	0	0	0
Wells		Tap or Grab	-	0	1	1	-	1	1	1	0		0
	GW-07	Tap or Grab	1	-	1	1	1	1	1	1	,	0	
South of East Tank Farm Residential Wells	GW-08	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-09	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Lorraine Process Area Church Well North Tank Farm	GW-10	Tap or Grab	1	1	1	1	1	1	1	1	0	0	0
Residential Well	GW-11	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of North Tank Farm Residential Well	GW-12	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Wilcox Residential Well	GW-13	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
East Tank Farm	GW-14	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Private Wells Not In Use	GW-15	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Total Investigation Tap Samples			15	1	15	15	15	15	15	15	0	0	0
Field duplicate	1 per 10	) samples	0	0	2	2	2	2	2	2	0	0	0
MS/MSDs	1 per 20 samples (extra volume only; not included in total sample count)		0	0	1	1	1	1	1	1	0	0	0
Total Private Supply Well Samples			15	1	17	17	17	17	17	17	0	0	0
Water QC Samples													
Trip blanks	1 per cooler containing aque	ous samples for VOC analysis	0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of for none	ledicated equipment per team	0	0	0	0	0	0	0	0	0	0	0
Total Water QC Samples Associated	with Private Supply Well Sample	ing	0	0	1	0	0	0	0	0	0	0	0
Piezometers							•						<u> </u>
Piezometers	PW-01 through PW-10	Low Flow	10	0	10	10	10	10	10	1	0	0	0
Total Investigation Tap Samples			10	0	10	10	10	10	10	1	0	0	0
Field duplicate	1 per 10	) samples	0	0	1	1	1	1	1	1	0	0	0
MS/MSDs		) samples cluded in total sample count)	0	0	1	1	1	1	1	1	0	0	0
Total Piezometer Samples			10	0	11	11	11	11	11	2	0	0	0
Water QC Samples					•							•	
Trip blanks	1 per cooler containing aque	ous samples for VOC analysis	0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of nonde	dicated equipment per team	0	0	1	1	1	1	1	1	0	0	0
Total Water QC Samples Associated			0	0	2	1	1	1	1	1	0	0	0
NOTES: Field parameters: pH, temperature, cond bgs = Below ground surface EDB = Ethylene dibromide MS = Matrix spike	ductivity, dissolved oxygen, oxidat	ion-reduction potential, and turbidit MSD = Matrix spike duplicate PAH = Polycyclic aromatic hydroc PCB = Polychlorinated biphenyl			QC = Quali SIM = Selec VOC = Vol:	tive ion mor							

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# TABLE 9. PROPOSED FIELD PROGRAM FOR VAPOR INTRUSION INVESTIGATION

Sample Type  Vapor Instrusio	Proposed Sample Area	Matrix	Sample Method	Sample Frequency	Sample Interval	Sample Identification	No. of Sample Locations	TO-15 SIM /TO-15
vapor mstrusic	Lorraine Process Area (LPA) Church		TO-15: 6-Liter Summa canister with 24-hour regulator	once in summer)	Sub-slab taken below slab	For sub-slab or crawl space air sample: LPA-SS-01 or LPA-CS-01 For indoor air sample: LPA-IA-01	2	2
Indoor Air/ Sub-Slab or Crawlspace	Lorraine Process Area Residence				Crawlspace taken in crawlspace  Indoor air sample collected from	For sub-slab or crawl space air sample: LPA-SS-02 or LPA-CS-02 For indoor air sample: LPA-IA-02	2	2
	Wilcox Process Area (WPA) Residence	Air/Soil Gas			within breathing zone (3 to 4 feet above ground surface) of the home	For sub-slab or crawl space air sample: WPA-SS-03 or WPA-CS-03 For indoor air sample: WPA-IA-03	2	2
Background	Upwind of sample locations in open area			Locations around perimeter of sampling area	5 to 8 feet off the ground	LPA-VIBG-01, LPA-VIBG-02, WPA-VIBG-03	4	4
Field duplicate	As close as possible, in space and time, to the original sample			1 outdoor location 1 sub-slab 1 indoor	Same as original sample	Same as original with "D" added to the ID, for example LPA or WPA-SS-01D	3	3
Total Vapor In	trusion Samples						13	13

SIM = Selective ion monitoring

TABLE 4. QUALITY ASSURANCE INDICATOR CRITERIA

Indicator Parameter	Analytical Parameter	QC Sample <sup>a</sup>	Acceptance Criteria for Laboratory Analysis						
Accuracy	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Blanks <sup>b</sup>	50 to 150 percent recovery (MS/MSD) Less than CRQL (blanks)						
(percent recovery)	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM	MS LCS Reference samples Blanks <sup>a</sup>	75 to 125 percent recovery (MS) 80 to 120 percent recovery (LCS) Limits per supplier (reference sample) Less than CRDL (blanks)						
	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Field duplicates	30 percent RPD (MS/MSD) 50 percent RPD (field duplicates)						
	Background PAHs and Dioxins/Furans via ICS	Field replicates	30 percent RPD (field replicates)						
Precision (RPD)	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM, Asbestos, General Chemistry Parameters	MS MSD or MD Field duplicates Laboratory duplicates	20 percent RPD (MS, MSD, MD aqueous) 35 percent RPD (MS, MSD, MD solid) 50 percent RPD (field duplicates) 25 percent (laboratory duplicates)						
	Background TAL Metals via ICS	Field replicates	30 percent RPD (field replicates)						
Sensitivity (quantitation limits)	Analytical tests	MS MD or MSD Field duplicates Laboratory duplicates	Not applicable						
Completeness	The objective for data complete	eness is 90 percent.							
Representativeness	The sampling network and analytical methods for this site are designed to provide data that are								
Comparability	The use of standard published s data of known quality. These d		hods, and the use of QC samples, will ensure er data of known quality.						

#### NOTES:

AVS = Acid-volatile sulfide PAH = Polycyclic aromatic hydrocarbon

 $\label{eq:cross_contract} CRDL = Contract\text{-required Detection Limit} \qquad \qquad PCB = Polychlorinated \ biphenyl$ 

 $CRQL = Contract\text{-required Quantitation Limit} \qquad \qquad QC = Quality \ control$ 

EDB = Ethylene bromide RPD = Relative percent difference
ICS = Incremental Composite Sampling SVOC = Semivolatile organic compound
LCS = Laboratory control sample SEM = Simultaneously-extracted metal

MD = Matrix duplicate TAL = Target Analyte List

MS = Matrix spike TPH = Total petroleum hydrocarbons MSD = Matrix spike duplicate VOC = Volatile organic compound

<sup>&</sup>lt;sup>a</sup> Not all listed QC samples apply to all analytical parameters. QC samples are analytical method specific.

<sup>&</sup>lt;sup>b</sup> May include method blanks, reagent blanks, instrument blanks, calibration blanks, trip blanks and field blanks.

TABLE 12. PARAMETERS, METHODS, REQUIRED VOLUME, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Method	Volume and Container <sup>1</sup>	Preservatives	Holding Time <sup>2</sup>
Air Samples				
VOCs	EPA TO-15 SIM	One 6-liter evacuated summa canister	None	30 days
Aqueous Samples Alkalinity	Standard Method 2320 B	One 250-milliliter HDPE bottle	Store at <6°C (4+2°C)	7 days
-			NaOH to pH >12;	
Cyanide	CLP ISM02.3	One 1-liter HDPE bottle	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	14 days
Dioxins and Furans	CLP HRSM01.2	Two 1-liter amber glass bottles	Store at <6°C (4+2°C)	360 days
Hardness	EPA Method 130.2	One 100-milliliter HDPE bottle	HNO <sub>3</sub> to pH $\leq$ 2; Store at $<$ 6°C (4+2°C)	6 months
Hexavalent Chromium	SW-846 Method 7199 or Standard Method 218.6	One 125-milliliter HDPE bottle	Store at <6°C (4+2°C)	24 hours
Metals (including Hg)	CLP ISM02.3 (ICS/AES and ICS/MS)	One to two 1-liter HDPE bottles	HNO <sub>3</sub> to pH $\leq$ 2; Store at $<$ 6°C (4+2°C)	180 days (28 days for Hg)
PCBs (Aroclors)	CLP SOM02.3	Two 1-liter amber glass bottles	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	7 days
Pesticides	CLP SOM02.3	Two 1-liter amber glass bottles	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	7 days
SVOC SIM (PAHs)	CLP SOM02.3	Four 1-liter amber glass bottles	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	7 days
SVOCs	CLP SOM02.3	Two 1-liter amber glass bottles	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	7 days
Total Dissolved Solids	EPA Method 160.1	One 1-liter HDPE bottle	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	7 days
Total Organic Carbon	Standard Method 5310	One 250-milliliter glass bottle	$H_2SO_4$ to pH <2; Store at <6°C (4+2°C)	28 days
Total Suspended Sediment	ASTM Method D 3977-97	One 200-milliliter HDPE bottle	Store at <6°C (4+2°C)	7 days
VOCs	CLP SOM02.3	Three 40-milliliter amber glass VOA vials (filled to capacity with no headspace)	HCL to pH <2; Store at <6°C (4+2°C)	14 days
Soil and Sediment Samples		(mod to supure) will no newapase)	<i>Store at</i> 0 0 (1/2 0)	
Asbestos	CARB Method 435	One 16-ounce glass jar	None	Unspecified
AVS/SEM	EPA 821/R-91-100 SW-846 Method 6010C/9034	One 8-ounce amber glass jar (filled to capacity)	Store at <6°C (4+2°C)	14 days
Cyanide	CLP ISM02.3	One 8-ounce glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C (4+2°C)	14 days
Dioxins and Furans	CLP HRSM01.2	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	360 days
Grain Size	ASTM Method D422	1-gallon plastic bag	None	Unspecified
Hexavalent Chromium	SW-846 Methods 3060 and 7199	One 8-ounce glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C (4+2°C)	30 days
Metals (including Hg)	CLP ISM02.3 (ICP/AES and ICP/MS)	One to two 8-ounce glass jars with TeflonTM-lined caps	Store at <6°C (4+2°C)	180 days (28 days for Hg)
PCBs (Aroclors)	CLP SOM02.3	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	14 days
Pesticides	CLP SOM02.3	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	14 days
pH	SW9045D	One 8-ounce glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C	Analyze immediately
SVOC SIM (PAHs)	CLP SOM02.3	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C (4+2°C)	14 days
SVOCs	CLP SOM02.3	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C (4+2°C)	14 days
Total Organic Carbon	Walkley- Black	One 8-ounce amber glass jar with Teflon <sup>TM</sup> -lined cap	Store at <6°C (4+2°C)	28 days
VOCs	CLP SOM02.3 SW-846 Method 5035 or 5035A (VOC sample preparation)	Three 5-gram coring tool devices (e.g., EnCore) samplers and one 4-ounce glass jar  Three closed-system pre-weighed 40-milliliter amber glass vials with magnetic stir bar and one 4-ounce glass jar	Store at <6°C (4+2°C)	48 hours
LNAPL Sample				
C3-C44 Whole Oil or C8-C40 Full Scan	ASTM Method D3328 or ASTM Method 5739	Two 40-milliliter VOA vials	Unpreserved	Unlimited
Alkyl Leads, EDB, MMT	EPA 8080 Modified (GC/ECD)	Two 40-milliliter VOA vials	Unpreserved	Unlimited
Investigation-derived Waste	е			
Reactivity	SW-846 Chapter 7	One 4-ounce glass jar with Teflon <sup>TM</sup> -lined cap	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	72 hours
Corrosivity (pH soil)	SW-846 Method 9045	One 4-ounce glass jar with Teflon <sup>TM</sup> -lined cap	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	72 hours
Corrosivity (pH liquid)	SW-846 Method 9040	One 500-milliliter glass bottle	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	72 hours
Corrosivity (steel)	SW-846 Method 1110	One 4-ounce glass jar One 250-milliliter HDPE bottle	Store at <6°C (4+2°C) Store at <6°C (4+2°C)	7 days
Ignitability (solids)	SW-846 Method 1030	One 4-ounce glass jar	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	14 days
Ignitability (liquid)	SW-846 Method 1010 or 1020	One 250-milliliter HDPE bottle	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	14 days
TPH GRO	TX Method 1005	One 4-ounce amber glass jar	Store at <6°C (4+2°C)	14 days
TPH DRO and ORO		(filled to capacity)	Store at $<6^{\circ}\text{C} (4+2^{\circ}\text{C})$	-
TCLP Metals <sup>3</sup>	SW-846 Methods 1311, 3010, 6010, and 7470	100 grams minimum (solid) or 1 liter minimum (liquid) Plastic or glass container	Store at <6°C (4+2°C)	180 days (28 days for Hg)
TCLP SVOCs	SW-846 Methods 1311, 3510, and 8270C	100 grams minimum (solid) or 2 liters minimum (liquid) Glass containers	Store at <6°C (4+2°C)	14 days
TCLP VOCs	SW-846 Methods 1311 and 8260B	50 grams minimum (solid) or 120 milliliters minimum (liquid) Glass containers	Store at <6°C (4+2°C)	14 days

### NOTES:

AES = Atomic emission spectroscopy  $HNO_3 = Nitric acid$ 

ASTM = American Society for Testing and Materials ICP = Inductively-coupled plasma

AVS = Acid volatile sulfide MMT = Methylcyclopentadienyl manganese tricarbonyl CARB = California Air Resource Board MS = Mass spectrometry

 $\begin{array}{lll} \text{CLP} = \text{Contract Laboratory Program} & \text{NaOH} = \text{Sodium hydroxide} \\ \text{DRO} = \text{Diesel range organics } C_{10} - C_{28} & \text{ORO} = \text{Oil range organics} > C_{28} \\ \text{ECD} = \text{Electron capture detector} & \text{PAH} = \text{Polycyclic aromatic hydrocarbon} \\ \text{EDB} = \text{Ethylene dibromide} & \text{PCB} = \text{Polychlorinated biphenyl} \\ \text{GC} = \text{Gas chromatography} & \text{SEM} = \text{Simultaneously extracted metals} \\ \text{GRO} = \text{Gasoline range organics } C_6 - C_{10} & \text{SIM} = \text{Selective ion monitoring} \\ \text{H}_2\text{SO}_4 = \text{Sulfuric acid} & \text{SVOC} = \text{Semivolatile organic compound} \\ \end{array}$ 

HCL = Hydrochloric acid TCLP = Toxicity Characteristic Leaching Procedure

HDPE = High-density polyethylene TPH = Total petroleum hydrocarbons Hg = Mercury VOC = Volatile organic compound

<sup>&</sup>lt;sup>1</sup> It will be necessary to verify container requirements with the laboratory at the time of scheduling.

 $<sup>^{2}</sup>$  Holding time is measured from the time of sample collection to the time of sample extraction and/or analysis.

<sup>&</sup>lt;sup>3</sup> Arsenic, barium, cadmium, chromium, lead, mercury, silver, and selenium

SCREENING CRITERIA FOR AIR AND CLP REFERENCE LIMITS: Primary Compounds for Wilcox 7-27-16

				Project Screening		Achievable
Analyte	Analytical Method (1)	Units	CASRN	Level (4)	DL	RL
Volatile Organic Compound	s (VOCs), including Naphthalene					
Acetone	TO-15 SIM/TO-15	μg/m3	67-64-1	32,000	0.109	1.188
Benzene	TO-15 SIM/TO-15	μg/m3	71-43-2	0.36	0.249	0.31947
Bromodichloromethane	TO-15 SIM/TO-15	μg/m3	75-27-4	0.076	0.121	0.670
2-Butanone (Methyl Ethyl	TO-15 SIM/TO-15	μg/m3	78-93-3	5,200	0.147	1.180
Ketone)						
Carbon Tetrachloride	TO-15 SIM/TO-15	μg/m3	56-23-5	0.47	0.069	0.6292
Chloroform	TO-15 SIM/TO-15	μg/m3	67-66-3	0.12	0.054	0.4883
Chloromethane	TO-15 SIM/TO-15	μg/m3	74-87-3	94	0.114	1.032
3-Chloropropene	TO-15 SIM/TO-15	μg/m3	107-05-1	0.47	0.213	1.565
alpha-Chlorotoluene	TO-15 SIM/TO-15	μg/m3	100-44-7	0.057	0.072	0.518
Cumene	TO-15 SIM/TO-15	μg/m3	98-82-8	420	0.059	0.492
Cyclohexane	TO-15 SIM/TO-15	μg/m3	110-82-7	6,300	0.072	0.344
1,2-Dichlorobenzene	TO-15 SIM/TO-15	μg/m3	95-50-1	210	0.144	0.601
1,3-Dichlorobenzene	TO-15 SIM/TO-15	μg/m3	541-73-1	NS	0.114	0.601
cis-1,2-Dichloroethene	TO-15 SIM/TO-15	μg/m3	156-59-2	NS	0.107	0.39648
1,1-Dichloroethane	TO-15 SIM/TO-15	μg/m3	75-34-3	1.8	0.077	0.40479
1,1-Dichloroethene	TO-15 SIM/TO-15	μg/m3	75-35-4	210	0.091	0.39652
1,2-Dibromoethane (EDB)	TO-15 SIM/TO-15	μg/m3	106-93-4	0.0047	0.115	0.76843
1,4-Dichlorobenzene	TO-15 SIM/TO-15	μg/m3	106-46-7	0.26	0.084	0.60127
rans-1,2-Dichloroethene	TO-15 SIM/TO-15	μg/m3	156-60-5	NS	0.075	0.39648
1,2-Dichloropropane	TO-15 SIM/TO-15	μg/m3	78-87-5	0.28	0.055	0.462
cis-1,3-Dichloropropene	TO-15 SIM/TO-15	μg/m3	10061-01-5	NS	0.077	0.454
1,4-Dioxane	TO-15 SIM/TO-15	μg/m3	123-91-1	0.56	0.133	0.360
Ethyl Benzene	TO-15 SIM/TO-15	μg/m3	100-41-4	1.1	0.096	0.43419
4-Ethyltoluene	TO-15 SIM/TO-15	μg/m3	622-96-8	NS	0.088	0.492
Hexachlorobutadiene	TO-15 SIM/TO-15	μg/m3	87-68-3	0.13	0.469	5.333
Naphthalene	TO-15 SIM/TO-15	μg/m3	91-20-3	0.83	NS	NS
1,1,2,2-Tetrachloroethane	TO-15 SIM/TO-15	μg/m3	79-34-5	0.048	0.124	0.68654
Γoluene	TO-15 SIM/TO-15	μg/m3	108-88-3	5,200	0.064	0.37681
Γrichloroethene	TO-15 SIM/TO-15	μg/m3	79-01-6	0.48	0.107	0.53738
1,2,4-Trimethylbenzene	TO-15 SIM/TO-15	μg/m3	95-63-6	7.3	0.034	0.492
n,p-Xylene	TO-15 SIM/TO-15	μg/m3	108-38-3	100	0.056	0.43423
o-Xylene	TO-15 SIM/TO-15	μg/m3	95-47-6	100	0.069	0.43423
Vinyl Chloride	TO-15 SIM/TO-15	μg/m3	75-01-4	0.17	0.023	0.255

#### NOTES:

- 1. Analytical laboratory will screen the sample to determine if sample will be analyzed via TO-15 SIM (low level) or TO-15.
- 2. U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) Summary Table May 2016 http://www.epa.gov/region9/superfund/prg/.
- 3. Values calculated based on EPA current residential air RSLs (updated May 2016) modified using the methodology specified in the EPA OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air , June 2015 by dividing by an attenuation factor of 1 for crawlspace soil gas and 0.03 for sub-slab soil gas.
- 4. The project screening level was selected to satisfy the EPA requirements asspectfied in the EPA OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air.
- 5. Achievable laboratory limits are for Eurofins Air Toxics, Inc., Folsom, California; limits determined for Quarter 3 of 2015. CASRN = Chemical Abstracts Service Registry Number
- c/nc = Carcinogen/non-carcinogen

NA = Not applicable NS = Not specified

P

RL = Reporting limit μg/m3= Microgram(s) per cubic meter

TO-15 = EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air , Second Edition.

#### REQUEST FOR LABORATORY SAMPLE ANALYSES

Site Name: Wilcox Oil Company	City/State: Bristow, OK	CERCLIS #: OK0001010917
GPRA Account #:2015 T 06L 06GGCO00	Site Spill ID # 06GG	Type of Investigation/Purpose: RI
EPA SAM, RPM, OSC: Katrina Higgins-Coltrain (RPM) Mail Code: 6SF-RL	Analytical Turnaround Time  Region 6 Lab: 35X_ CLP Organics: 7 14 21_X_ CLP Inorganics: 7 14 21 X_	Type of Contract: EPA RAC  Contractor: Patrick Appel Direct: 972-453-5038 Cell: 817-437-0563 Luis Vega Direct: 972-459-5040 Cell: 214-280-9031
		Shipping Contact: Patrick Appel and Luis Vega
Telephone #: 214-665-8143	Are preliminary results required? 48 hrs VOA ( ) Yes (X) No	Telephone #: see above
Fax #:	72 hrs Extractables ( ) Yes (X) No 72 hrs Inorganics ( ) Yes (X) No	On Site Ph #: see above
		E-Mail address: Patrick Appel pappel@eaest.com Luis Vega lvega@eaest.com
Potential Enforcement Action?  () Yes (X) No	Requires justification and prior approval.	Date Sample Control Center Received Request For Sample Analysis:
Proposed Sampling Period	week of September 12 - 16, 2016	

Please assure that this request for analytical services has been signed and dated by the appropriate Site Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP, O&M Plan, GWMP,DAW, or other relevant plan being submitted with this Request For Sample Analyses? QAPP was previously submitted 6/30/16

If no, please explain (expected date of submission etc.):

Submitted 6/30/16

Signature of EPA Site Assessment M	lanager (SAM), Remedial Project Manager (RPM), or On Scene
Coordinator (OSC) to signify approva	<mark>l of this analytical service request.</mark>
Signature:	Date:

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

# 1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples	Field Q	C Samples
		(without QC) high/low conc	How many?	Type?
Soil (refer to attached Table 6)	Volatiles			Trip blank Duplicate Matrix spike Equipment Blank
Estimate 10 location per day with 4 samples	Semivolatiles	1	2 1 1	Duplicate Matrix spike Equipment Blank
per location over one 5-day week	PAHs	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Metals including mercury	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Cyanide			Duplicate Matrix spike Equipment Blank
	Dioxins/furans	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Pesticides			Duplicate Matrix spike Equipment Blank
	PCB			Duplicate Matrix spike Equipment Blank
Water (refer to attached	Volatiles (including EDB) Trace Water	13	1 2 1	Trip blank Duplicate Matrix Spike
Table 8)	Volatiles (including EDB) Low Water			Trip blank Duplicate Matrix Spike
	Semivolatiles Low Water	13	2 1	Duplicate Matrix Spike
	PAHs Low Water by SIM	13	2 1	Duplicate Matrix Spike
	Hexavalent Chromium	13	2 1	Duplicate Matrix spike
	Metals including mercury	13	2 1	Duplicate Matrix spike
	Cyanide	13	2 1	Duplicate Matrix spike
Air (refer to attached table 9)	Volatiles Semivolatiles (naphthalene and	10 10	3	Duplicate Duplicate
,	1,4-dioxane)			

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

### Current CLP methods (04/06/16) are: Organics by SOM02.3 Inorganics by ISM02.3

Refer to attached Table 12 and excel sheets.

Matrix	Analysis	Methods
Soil	Semivolatiles	SOM02.3 (Low Soil)
	PAHs	SOM02.3 (Low Soil by SIM)
	Metals including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Dioxins/Furans	CLP HRSM01.2
	Volatiles	SOM02.3 Trace Water
Water	Volatiles	SOMOZ.S Trace Water
	Semivolatiles	SOM02.3 (Low Water)
	PAHs	SOM02.3 (Low Water by SIM)
	Metals, including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Hexavalent Chromium	SW-846 Method 7199 or Standard method 218.7
Air	Volatiles Naphthalene 1,4-Dioxane	EPA TO-15 SIM

#### Additional Information:

Complete the following information if Method 5035 for VOA soils has been requested:

# of low conc. soils	# of medium conc. soils	Type of Vials	# of low conc. soils	# of medium conc. soils

- 3. CLP Modified Analysis Clause The latest Statement of Works (SOWs), includes a modified analysis clause. The modified analysis allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. Information must be submitted <u>three weeks</u> prior to the sampling event. The information the client must submit three weeks prior to the sampling event are; Lab Request Form and the approved sampling plan/QAPP.
- 4. Analytical results required (specify laboratory documentation and reporting requirements, reporting

units, format requirements, etc.): (QA/R5 - Elements A6 and B4)

Standard CLP and/or EPA Region 6 Houston Lab deliverable

5. Data requirements (reporting limits; per analyte per matrix; reporting units; applicable reference levels, etc.): (QA/R5 - Elements A7, B1, and B4) (Attach extra pages if necessary) For CLP capabilities - http://www.epa.gov/superfund/programs/clp/facts.htm. For Region 6 Laboratory capabilities - http://www.epa.gov/earth1r6/6lab/r6lab.htm

Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water. Also, samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the method CRQL's.

 a. Compounds/chemicals of concern (Action levels etc.) – Required information – List the compounds/analytes driving the investigation and the action level required to meet DQO's.

Parameters	Action Levels / Detection Limits			
	water (µg/L) soil/sediment (ug/kg)			
Please see attached excel table for ground water and soil.				

The excel tables provide the volatile, semivolatile, PCB, Pesticide, Dioxin, and metals parameters that are of highest interest for the site. The Project screening level is the requested Action Level/Detection limit for this project. Tab 1 is for ground water, Tab 2 is for air, and Tab 3 is for soil.

6. QC Requirements (PE samples & frequency, spikes, duplicates, blanks, & frequency)

QC Type	Frequency	QC Limits
Trip Blank	1 per cooler	See attached Tables 12 and 4.
Duplicate	1 per 10	
Matrix Spike	1 per 20	

#### REQUEST FOR LABORATORY SAMPLE ANALYSES

Site Name: Wilcox Oil Company	City/State: Bristow, OK	CERCLIS #: OK0001010917		
GPRA Account #:2015 T 06L 06GGCO00	Site Spill ID # 06GG	Type of Investigation/Purpose: RI		
EPA SAM, RPM, OSC: Katrina Higgins-Coltrain (RPM)  Mail Code: 6SF-RL	Analytical Turnaround Time  Region 6 Lab: 35X_ CLP Organics: 7 14 21_X_ CLP Inorganics: 7 14 21 X_	Type of Contract: EPA RAC  Contractor: Patrick Appel Direct: 972-453-5038 Cell: 817-437-0563 Luis Vega Direct: 972-459-5040 Cell: 214-280-9031		
		Shipping Contact: Patrick Appel and Luis Vega		
Telephone #: 214-665-8143	Are preliminary results required? 48 hrs VOA ( ) Yes (X) No	Telephone #: see above		
Fax #:	72 hrs Extractables ( ) Yes (X) No 72 hrs Inorganics ( ) Yes (X) No	On Site Ph #: see above		
		E-Mail address: Patrick Appel pappel@eaest.com Luis Vega Ivega@eaest.com		
Potential Enforcement Action?  () Yes (X) No	Requires justification and prior approval.	Date Sample Control Center Received Request For Sample Analysis:		
Proposed Sampling Period: week of September 19 - 23, 2016				

Please assure that this request for analytical services has been signed and dated by the appropriate Site Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP, O&M Plan, GWMP,DAW, or other relevant plan being submitted with this Request For Sample Analyses? QAPP was previously submitted 6/30/16

If no, please explain (expected date of submission etc.):

Submitted 6/30/16

Signature of EPA Site Assessment M	lanager (SAM), Remedial Project Manager (RPM), or On Scene
Coordinator (OSC) to signify approva	<mark>l of this analytical service request.</mark>
Signature:	Date:

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

# 1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples	Field QC Samples		
	(without QC) high/low conc		How many?	Type?	
Soil (refer to attached Table 6)	Volatiles	205	5 20 10 10	Trip blank Duplicate Matrix spike Equipment Blank	
Estimate 10 location per day with 4 samples	Semivolatiles	205	20 10 10	Duplicate Matrix spike Equipment Blank	
per location over one 5-day week	PAHs	205	20 10 10	Duplicate Matrix spike Equipment Blank	
	Metals including mercury	205	20 10 10	Duplicate Matrix spike Equipment Blank	
	Cyanide	205	20 10 10	Duplicate Matrix spike Equipment Blank	
	Dioxins/furans	10	1 1 1	Duplicate Matrix spike Equipment Blank	
	Pesticides	10	1 1 1	Duplicate Matrix spike Equipment Blank	
	PCB	10	1 1 1	Duplicate Matrix spike Equipment Blank	
Water (refer to attached	Volatiles (including EDB) Trace Water	1	1 1 1	Trip blank Duplicate Matrix Spike	
Table 8)	Volatiles (including EDB) Low Water	1	1 1 1	Trip blank Duplicate Matrix Spike	
	Semivolatiles Low Water	1	1 1	Duplicate Matrix Spike	
	PAHs Low Water by SIM	1	1	Duplicate Matrix Spike	
	Hexavalent Chromium	1	1 1	Duplicate Matrix spike	
	Metals including mercury	1	1	Duplicate Matrix spike	
	Cyanide	1	2 1	Duplicate Matrix spike	
				Duplicate Duplicate	

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

### Current CLP methods (04/06/16) are: Organics by SOM02.3 Inorganics by ISM02.3

Refer to attached Table 12 and excel sheets.

Matrix	Analysis	Methods
	Volatiles	5035 + SOM02.3 (Low Soil)
Soil	Semivolatiles	SOM02.3 (Low Soil)
	PAHs	SOM02.3 (Low Soil by SIM)
	Metals including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Dioxins/Furans	CLP HRSM01.2
	Pesticides	SOM02.3
	PCB	SOM02.3
	Volatiles	SOM02.3 Trace Water
Water	Volatiles	SOM02.3 (Low Water)
	Semivolatiles	SOM02.3 (Low Water)
	PAHs	SOM02.3 (Low Water by SIM)
	Metals, including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Hexavalent Chromium	SW-846 Method 7199 or Standard method 218.7

#### Additional Information:

Complete the following information if Method 5035 for VOA soils has been requested:

	# of low conc. soils	# of medium conc. soils	Type of Vials	# of low conc. soils	# of medium conc. soils
Pre-Weighed Vials with stir bar (Closed System Vials)	100	100			

3. CLP Modified Analysis Clause - The latest Statement of Works (SOWs), includes a modified analysis clause. The modified analysis allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. Information must be submitted <u>three weeks</u> prior to the sampling event. The information the client must submit three weeks prior to the sampling event are; Lab Request Form and the approved sampling plan/QAPP.

4. Analytical results required (specify laboratory documentation and reporting requirements, reporting units, format requirements, etc.): (QA/R5 - Elements A6 and B4)

Standard CLP and/or EPA Region 6 Houston Lab deliverable

5. Data requirements (reporting limits; per analyte per matrix; reporting units; applicable reference levels, etc.): (QA/R5 - Elements A7, B1, and B4) (Attach extra pages if necessary) For CLP capabilities - http://www.epa.gov/superfund/programs/clp/facts.htm. For Region 6 Laboratory capabilities - http://www.epa.gov/earth1r6/6lab/r6lab.htm

Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water. Also, samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the method CRQL's.

a. Compounds/chemicals of concern (Action levels etc.) – Required information – List the compounds/analytes driving the investigation and the action level required to meet DQO's.

Parameters	Action Levels / Detection Limits		
	water (µg/L) soil/sediment (ug/kg)		
Please see attached excel table for ground water and soil.			

The excel tables provide the volatile, semivolatile, PCB, Pesticide, Dioxin, and metals parameters that are of highest interest for the site. The Project screening level is the requested Action Level/Detection limit for this project. Tab 1 is for ground water, Tab 2 is for air, and Tab 3 is for soil.

6. QC Requirements (PE samples & frequency, spikes, duplicates, blanks, & frequency)

QC Type	Frequency	QC Limits
Trip Blank	1 per cooler	See attached Tables 12 and 4.
Duplicate	1 per 10	
Matrix Spike	1 per 20	